CLAIMS

What is claimed is:

1. An apparatus, comprising:

one or more heating elements; and

one or more elongated beams;

wherein the one or more heating elements comprise a heating element, wherein the one or more elongated beams comprise an elongated beam, wherein the heating element is coupled with the elongated beam;

wherein the heating element induces a time-varying thermal gradient in the elongated beam to cause one or more oscillations of one or more of the one or more elongated beams.

2. The apparatus of claim 1, wherein the heating element employs the time-varying thermal gradient in the elongated beam to cause one or more thermoelastic reactions in the elongated beam that effect one or more of the one or more oscillations.

3. The apparatus of claim 1, wherein the heating element comprises a resistor;

wherein the resistor conducts a time-varying electrical signal, wherein the time-varying electrical signal induces a Joule heating of the resistor that causes the time-varying thermal gradient in the elongated beam.

4. The apparatus of claim 1, wherein the heating element induces the time-varying thermal gradient in the elongated beam to cause the one or more oscillations to occur approximately at a natural frequency of the elongated beam.

5. The apparatus of claim 4, wherein the elongated beam comprises a first elongated beam, wherein the one or more elongated beams comprise a second elongated beam, wherein the natural frequency of the first elongated beam is substantially the same as a natural frequency of the second elongated beam;

wherein a nodal point of the first elongated beam abuts a first face of a transverse beam;

wherein a nodal point of the second elongated beam abuts a second face of the transverse beam;

wherein the heating element cooperates with the first elongated beam to cause one or more oscillations of the second elongated beam approximately at the substantially same natural frequency of the first elongated beam and the second elongated beam.

6. The apparatus of claim 5, wherein the heating element oscillates the first elongated beam to stress the transverse beam to cause the one or more oscillations of the second elongated beam.

7. The apparatus of claim 1, wherein the heating element induces the time-varying thermal gradient in the elongated beam to cause the one or more oscillations to occur approximately at a natural frequency of the one or more of the one or more elongated beams.

8. The apparatus of claim 1, further comprising:

a feedback component coupled with the elongated beam;

wherein the feedback component provides feedback to a regulator component that serves to regulate one or more of the one or more oscillations of the one or more of the one or more elongated beams.

9. The apparatus of claim 8, wherein the feedback component comprises a piezoresistor;

wherein the piezoresistor comprises a variable resistance that changes based on a magnitude of the one or more of the one or more oscillations of the one or more of the one or more elongated beams;

wherein the piezoresistor provides feedback based on the variable resistance of the piezoresistor to the regulator component that serves to regulate the time-varying thermal gradient in the elongated beam to cause the one or more oscillations of the one or more of the one or more elongated beams.

10. The apparatus of claim 8, wherein the feedback component comprises a capacitive sensor;

wherein the capacitive sensor comprises a variable capacitance that changes based on a magnitude of the one or more of the one or more oscillations of the one or more of the one or more elongated beams;

wherein the capacitive sensor provides feedback based on the variable capacitance of the capacitive sensor to the regulator component that serves to regulate the time-varying thermal gradient in the elongated beam to cause the one or more oscillations of the one or more of the one or more elongated beams.

11. The apparatus of claim 1, further comprising:

a pickoff component coupled with the elongated beam and/or the transverse beam;

wherein the one or more oscillations of the one or more of the one or more elongated beams comprise one or more drive oscillations;

wherein an angular velocity of the elongated beam and the one or more drive oscillations induce a Coriolis effect on the elongated beam that causes one or more transverse oscillations of the elongated beam, wherein the one or more drive oscillations are orthogonal to the one or more transverse oscillations;

wherein the pickoff component senses one or more of the one or more transverse oscillations of the elongated beam to provide feedback to a processor component that serves to measure a magnitude of the angular velocity of the elongated beam.

12. The apparatus of claim 11, wherein the pickoff component comprises a piezoresistor;

wherein the piezoresistor comprises a variable resistance that changes based on a magnitude of the one or more of the one or more transverse oscillations of the elongated beam;

wherein the piezoresistor measures the angular velocity of the elongated beam based on the variable resistance of the piezoresistor.

13. The apparatus of claim 11, wherein the pickoff component comprises a capacitive sensor;

wherein the capacitive sensor comprises a variable capacitance that changes based on a magnitude of the one or more of the one or more transverse oscillations of the elongated beam;

wherein the capacitive sensor measures the angular velocity of the elongated beam based on the variable capacitance of the capacitive sensor.

14. An apparatus, comprising:

one or more electrostatic elements; and

one or more elongated beams;

wherein the one or more electrostatic elements comprise an electrostatic element, wherein the one or more elongated beams comprise an elongated beam, wherein the electrostatic element is coupled with the elongated beam;

wherein the electrostatic element employs a time-varying voltage that creates an electrostatic force on the elongated beam to cause one or more oscillations of one or more of the one or more elongated beams.

15. The apparatus of claim 14, further comprising:

a feedback component coupled with the elongated beam;

wherein the feedback component provides feedback to a regulator component that serves to regulate one or more of the one or more oscillations of the one or more of the one or more elongated beams.

16. The apparatus of claim 15, wherein the feedback component comprises a piezoresistor;

wherein the piezoresistor comprises a variable resistance that changes based on a magnitude of the one or more of the one or more oscillations of the one or more of the one or more elongated beams;

wherein the piezoresistor provides feedback based on the variable resistance of the piezoresistor to the regulator component that serves to regulate the time-varying thermal gradient in the elongated beam to cause the one or more oscillations of the one or more of the one or more elongated beams.

17. The apparatus of claim 15, wherein the feedback component comprises a capacitive sensor;

wherein the capacitive sensor comprises a variable capacitance that changes based on a magnitude of the one or more of the one or more oscillations of the one or more of the one or more elongated beams;

wherein the capacitive sensor provides feedback based on the variable capacitance of the capacitive sensor to the regulator component that serves to regulate the time-varying thermal gradient in the elongated beam to cause the one or more oscillations of the one or more of the one or more elongated beams.

18. The apparatus of claim 14, further comprising:

a pickoff component coupled with the elongated beam and/or the transverse beam;

wherein the one or more oscillations of the one or more of the one or more elongated beams comprise one or more drive oscillations;

wherein an angular velocity of the elongated beam and the one or more drive oscillations induce a Coriolis effect on the elongated beam that causes one or more transverse oscillations of the elongated beam, wherein the one or more drive oscillations are orthogonal to the one or more transverse oscillations;

wherein the pickoff component senses one or more of the one or more transverse oscillations of the elongated beam to provide feedback to a processor component that serves to measure a magnitude of the angular velocity of the elongated beam.

19. The apparatus of claim 18, wherein the pickoff component comprises a piezoresistor;

wherein the piezoresistor comprises a variable resistance that changes based on a magnitude of the one or more of the one or more transverse oscillations of the elongated beam;

wherein the piezoresistor measures the angular velocity of the elongated beam based on the variable resistance of the piezoresistor.

20. The apparatus of claim 18, wherein the pickoff component comprises a capacitive sensor;

wherein the capacitive sensor comprises a variable capacitance that changes based on a magnitude of the one or more of the one or more transverse oscillations of the elongated beam;

wherein the capacitive sensor measures the angular velocity of the elongated beam based on the variable capacitance of the capacitive sensor.

21. A method, comprising the steps of:

inducing a time-varying thermal gradient in an elongated beam, of one or more elongated beams, to cause one or more first oscillations of one or more of the one or more elongated beams;

wherein an angular velocity of the one or more of the one or more elongated beams and the one or more first oscillations of the one or more of the one or more elongated beams induce a Coriolis effect on the one or more of the one or more elongated beams; and

measuring the angular velocity of the one or more of the one or more elongated beams by sensing a second oscillation of the one or more of the one or more elongated beams that results from the Coriolis effect on the one or more of the one or more elongated beams.

22. The method of claim 21, further comprising the step of:

regulating the time-varying thermal gradient in the elongated beam to maintain the one or more first oscillations at approximately a natural frequency of the one or more elongated beams for promoting one or more of the one or more first oscillations of the one or more of the one or more elongated beams.

23. A method, comprising the steps of:

creating an electrostatic force on an elongated beam, of one or more elongated beams, to cause one or more first oscillations of one or more of the one or more elongated beams;

wherein an angular velocity of the one or more of the one or more elongated beams and the one or more first oscillations of the one or more of the one or more elongated beams induce a Coriolis effect on the one or more of the one or more elongated beams; and

measuring the angular velocity of the one or more of the one or more elongated beams by sensing a second oscillation of the one or more of the one or more elongated beams that results from the Coriolis effect on the one or more of the one or more elongated beams.

24. The method of claim 23, further comprising the step of:

regulating the time-varying thermal gradient in the elongated beam to maintain the one or more first oscillations at approximately a natural frequency of the one or more elongated beams for promoting one or more of the one or more first oscillations of the one or more of the one or more elongated beams.

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